EXPLORING THE CONNECTION BETWEEN SALMON AND WELL-BEING TO STRENGTHEN A FOOD SYSTEM INTERVENTION IN WESTERN ALASKA

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A

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Abstract

Effective interventions aimed at changing dietary behaviors in indigenous communities can benefit from understanding local perceptions and values connected to culturally important foods. Formative research in collaboration with community members to explore these perceptions is a necessary step in the process of designing effective interventions, yet few studies elaborate on the details of this process. Research conducted in a remote Yup'ik community in Western Alaska explored the connection between salmon and well-being to strengthen a food system intervention. Qualitative data were collected, collaboratively reviewed with a community work group, and analyzed using thematic analysis. Nine major themes emerged from the analysis to represent aspects of well-being supported by salmon. Ongoing collaboration between academic and community partners informed the development of the final intervention design using the formative research findings. The development of this process to incorporate local meanings of a culturally important food into a food system intervention elucidates one way a community-academic partnership can strengthen food system interventions in indigenous communities.

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Chapter 1 Literature review

1.1 Designing food system interventions to address nutrition transition

This thesis discusses strategies for designing food system interventions to improve dietary quality in indigenous communities undergoing changes in diet and lifestyle, also known as a nutrition transition. While interventions to strengthen local food systems and promote traditional foods have been implemented in indigenous communities worldwide, the process of implementing such an intervention in remote Yup'ik communities of the Yukon Kuskokwim Delta is unknown. Because an understanding of local perspectives on health and well-being is essential to inform and strengthen intervention design, this chapter will review relevant literature on the Yup'ik worldview, conceptions of wellness, and values that contribute to individual and community well-being.

1.2 Yup'ik perspectives on individual and community well-being

To inform the design and development of culture-centered health interventions, an understanding of local ways of knowing and viewing health and well-being must be explored. Outside researchers who seek to implement nutrition interventions in Yup'ik communities need to take the time to understand and adjust to the way that local people perceive food and how it affects "the physical, psychological, social and spiritual dimensions of all age and gender groups in community life"(Kuhnlein et al., 2006). A successful food system intervention will necessarily include understanding and incorporating "the holistic knowledge of and beliefs about food, well-being and health held by indigenous peoples" (Kuhnlein et al., 2006; Smith, 1999). Understanding patterns of dietary change to systematically promote more healthful transitions is also important (Popkin, 2002). In Alaska, Loring and Gerlach assert the need for integrative models of health that "incorporate place-based social and cultural considerations of food access and utilization" (Loring & Gerlach, 2009).

Ethnoecology recognizes the value of local knowledge and aims to understand local perspectives about a given phenomena or realm of experience (Nazarea, 1999). This field provides an interdisciplinary approach to an array of complex contemporary challenges that will

require an integration of indigenous and Western "scientific" epistemologies, knowledge systems, and ways of knowing and evaluating the world. Using an ethnoecology framework, this review draws from a limited body of literature to gain a better understanding of Yup'ik ways of health and well-being, or "living a good life," as this concept is best understood. More specifically, the review focuses on the special role of salmon, fish and other culturally important foods for Yup'ik people. Anthropological works, compilations of oral histories, ethnographic films, and biomedical articles were reviewed. The last section provides a commentary on how the literature can inform the process of working with community members to develop a Yup'ik-centered nutrition intervention in the Yukon-Kuskokwim Delta.

1.2.1 Yup'ik worldview

The traditional Yup'ik worldview is often defined as a way of life governed by complex relationships between the human being and the natural world (Kawagley, 1995; Fienup-Riordan, 1991). Part of this worldview involves rituals, ceremonies, respect for the earth, and maintaining balance between the human, natural, and spiritual realms (Kawagley, 1995). Despite influences of contemporary Western society, Kawagley's writing maintains that an ecological perspective that emphasizes the interconnectedness of all things continues to be important in Yup'ik traditions and values. Kawagley's well-known "tetrahedral model" illustrates this interrelationship between the human, natural, and spiritual realm (Kawagley, 1995). According to this conceptual framework, the three realms support the whole of the Yup'ik worldview, and the human experience seeks balance and constant communication between all three. Kawagley mentions that values that sustain this worldview include sharing, cooperation, respect for the wisdom of the elders, respect for the extended family, humility, and tolerance.

Building upon Kawagley's model, scholar Theresa John presents another conceptual model of the Yup'ik worldview that she calls *Ellarpak* that emphasizes the ancient Yup'ik circular-and-dot motif called *ellam iinga* (the eye of the universe and awareness) to illustrate the pathways between the human and spirit worlds (John, 2010). The dots of John's model signify movement between the worlds of the living and the dead as well as the worlds of humans and nonhumans. As the dots of John's model signify movement between the world of the living and

the dead, the drum shape of her model alludes to the importance of music and dance as part of healing and ceremonial practices (John, 2010).

Both conceptual models highlight the role of complex relationships in the Yup'ik worldview that extend past the human realm to include the spiritual and natural worlds. The foundation of this worldview necessarily emphasizes values and traditions to promote careful awareness and actions to maintain a balance between these worlds. Throughout the literature on Yup'ik conceptions of health and well-being, this need for balance, harmony, and maintenance of relationships appears to be a consistent theme (Fienup-Riordan, 1995; John, 2010; Kawagley, 1995; Mohatt et al., 2004; Wolsko et al., 2006).

1.2.2 Yup'ik conceptions of wellness

Colonization during the late twentieth century resulted in epidemics, cultural loss, and the introduction of new technologies and worldviews that have impacted the health and well-being of communities (Wolsko et al., 2006). Many people in the region point to the loss of culture and the erosion of the traditional Yup'ik lifestyle as a the root of many social and economic challenges that people face today, including problems of diet and chronic disease (Wolsko et al., 2006).

Interestingly, a study on Yup'ik conceptions of wellness revealed that "traditional Yup'ik values, grounded in a subsistence way of life, practiced for countless generations, continue to inform patterns of thinking about healthy living, even in the face of profound cultural change" (Wolsko et al., 2006). Fitting within Kawagley's tetrahedral model, the study highlighted the connection between the communities and the natural landscape and the maintenance of harmony with one's relationships as important contributors to the well-being of an individual. The intimate connection between individual and community health cannot be ignored, and the authors note that the values of reciprocity, respect, sharing, and maintaining harmony within the extended family, community and natural environment run counter to the emphasis on individualism and separation from nature in the dominant culture of the United States that also influences Western notions and biomedical definitions of health and wellness.

The following sections describe selected values from the anthropological literature that can be helpful for guiding the design of a culturally-appropriate food system intervention in a Yup'ik community.

1.2.3 Intergenerational transmission of knowledge

Irreversible loss of knowledge about ways for living increases the vulnerability of the local food system by reducing the intellectual resources needed to use indigenous food resources and to promote Yup'ik pathways of wellness (Kuhnlein & Receveur, 1996). An important consideration for a nutrition intervention involves not just providing healthy food and encouraging consumption of it, but also the intergenerational transmission of knowledge, experience, and wisdom associated with those culturally important foods. Johns and Stahpit best express the need for promoting traditional food systems because "traditional systems, once lost, are hard to recreate" (Johns & Sthapit, 2004). The erosion of Yup'ik traditional food knowledge and practice will require generations of Yup'ik people to continue practicing the subsistence lifestyle while at the same time adding their personal experiences in the context of change to ensure its long-term survival (Holthaus, 2008).

In *Qanruyuteput Iinruugut: Our Teachings Are Medicine*, Josephine Enoch of Tuntutuliak spoke of her granddaughter. "When I cut fish, even though she was small, I let her try when she wanted to. And even though she made a mess, I let her continue without stopping her. So today she knows how to work" (Rearden, 2009). This statement emphasizes the importance of allowing children to help cutting fish and preparing food. Theresa Moses of Toksook Bay echoes this when she says, "encourage your daughter to learn, that you [as mother] will not always be the sole provider and will eventually get older and lose strength [and the ability to work]…When she becomes skilled she will be grateful" (Rearden, 2009). The words of these two women emphasize the importance of intergenerational transmission of knowledge for the well-being of young people to learn important skills and to also be able to one day support others in their community by being able to provide food to those who may one day no longer be able to provide for themselves.

1.2.4 Respect animals and the natural environment

Respect for the natural environment and its non-human inhabitants was an important aspect of Yup'ik cosmology that emphasized balancing relationships between these worlds since the well-being of both human and non-human were linked. This included respect for the lives of animals and admonishments against wastefulness. In one account, Joseph Lomack of Akiachuk quotes an elder as saying "don't ever let the catches of your traps *kivgucecaqunaciki* [sink]. They are set in the water during the spring and they just place them in the water, wasting them. They say that place will no longer have fish" (Rearden, 2009). This admonishment warned that the repercussions of wasting life and wasting food would have its negative consequences on the future of the person.

Similarly to not wasting food, elders spoke about the importance of taking care of food, and to "not to step on food scraps whatsoever and places where they worked on fish" (Rearden, 2009). The respect for animals' bodies as well as their habitats reinforced the interdependent relationship between people and the non-human world.

1.2.5 Respect other people

In Kawagley's tetrahedral model, the notion of respect extends to all realms represented: human, natural, and spiritual. This message is also present in the stories and advice from many Yup'ik elders. Frank Andrew, for instance, said, "We should respect everything. Being respectful and honoring others is the way to lead a good life" (Rearden, 2009). With regards to food and fishing, respect for the property of others' was also important. Joseph Lomack of Akiachuk admonishes against stealing. "They also warned young people about taking fish from others' traps and nets. They say when they take fish from someone else's traps and nets, it leads to a life of impoverishment" (Rearden, 2009). These examples demonstrate how personal well-being hinges on community well-being by maintaining a good relationship between oneself and others.

1.2.6 Hard work and discipline

In various compilations of oral histories, elders emphasize the role of hard work and discipline in leading a good life. Respected elder Frank Andrew said, "Fish and animals become

available and then are gone, traveling north. That is why they told us not to be lazy and sit idle while they were available" (Rearden, 2009). Hard work and discipline for timely work was especially important because the actions of humans must accommodate the seasonal cycles of the natural world. This value founded upon the Yup'ik worldview can be linked to promoting the well-being of an individual to ensure that he or she is able to provide for themselves. It can also be linked to community well-being as well because the well-being of the community depends on the contribution of all individuals.

1.2.7 Respect elders: Listening to words of wisdom

Heeding the wisdom and knowledge passed down from the elders to younger generations is important to understanding Yup'ik concepts of wellness. Yup'ik epistemology and ways of knowing include a kind of teaching called *eyagyarat* that are said to be instructions for living a good life. According to Frank Andrew, "The instructions that we are taught admonish us not to live immorally but to lead good lives and treat everything and everyone around us with kindness and not to break the instructions we are taught" (Rearden, 2009). He notes how these teachings and instructions for living can contribute to physical health when he says, "We must follow restrictions in everything we do. This applies even to things that our non-Native counterparts have made. There is no teaching for it if there are no restrictions and directions attached to it. Everything has instructions through admonishments. A person can own that thing for a long time by trying not to break the directions attached to it. And it can be used for a long time" (Rearden, 2009).

In one oral history, Theresa Moses expressed concern that "A person whose mind is preoccupied with things they consider more important will not soak in the traditional teachings he hears by word of mouth. Their minds are only preoccupied with the job they value more. They are distracted by their jobs and schooling" (Rearden, 2009). These words speak to the challenge of balancing time needed to continue honoring ancestral wisdom while also tending to the needs of the contemporary context in a world limited by time. For a nutrition or food system intervention aimed at reaching youth, time and opportunities built into the program that are dedicated to balancing Western-style nutrition education with traditional words of wisdom may be a way to honor Yup'ik ways of knowing and ways of being healthy.

1.2.8 Generosity

In the literature, having a generous spirit is often linked to living a good and a long life. This generosity to others can mean sharing with those who have less. According to Frank Andrew, "They say food helps to create family bonds. They say [elders and orphans] wish good fortune upon those who helped them. They say that an unseen entity, *Ellam Yua*, repays them. They always spoke of *Ellam Yua*. It was soon revealed that they were talking about God" (Rearden, 2009).

The way that a society treats its most disadvantaged can be viewed as a reflection of societal well-being and the individuals who are composed of it. The tradition of sharing a person's first catch with the community is one such practice (Rearden, 2009). By emphasizing the values of generosity and sharing, these traditions contribute to community well-being by strengthening social networks which are relied upon by individuals during time of need. This is reflected in potlatches in which communities plan and save for months in order to give away food and other gifts to guests from neighboring villages who attend the celebration. Gifts to others are said to return in other ways and in greater numbers to the individual, which once again emphasizes the connection between individual and community well-being in the Yup'ik worldview (Kamerling & Elder, 2005).

By contrast, lack of generosity diminishes well-being. Frank Andrew said, "They say those who are continually ungrateful and stingy break family bonds. They say that some women are stingy. Even though her husband wants to share, she causes him to lose relatives by being stingy" (Rearden, 2009).

Generosity can also include sharing of wisdom. Frank Andrew said, "They say one who is generous is one who not only gives but gives instruction freely becomes a friend and relative. One no longer feels uncomfortable around them" (Rearden, 2009).

1.2.9 Livelihoods: Earning a living

Many Yup'ik communities today continue to live off the land and sea for their livelihoods as participants in both the subsistence and cash economies. Food was and continues to function as currency in meeting one's needs for physical as well as economic sustenance. Nicholai Berlin noted, "We were not wealthy people, but they placed importance on having

enough to eat. A person who fished in the summer and stored them for winter use was considered wealthy because that type of person did not envy others and did not beg for food from his relatives. That kind of person was called a wealthy person" (Rearden, 2009). This notion ties together many of the values already mentioned since knowledge, hard work and discipline to catch and prepare fish, respect for that food, respect and generosity towards others in the community, all contribute to holistic Yup'ik ways of living a good life.

1.3 Concluding thoughts

Observations in the literature consistently emphasize the holistic nature of viewing health and well-being in the Yup'ik culture, a worldview that oftentimes comes in conflict with the conventional biomedical approach of treating symptoms and implementing interventions that are narrowly defined by Western categories of health. Epidemiological studies increasingly encompass an ecological model to examine determinants at various levels in a web of causal factors that lead to undesirable health outcomes. However, these studies continue to be limited when the resulting interventions aimed at prevention, such as nutrition, suicide prevention, or drug and alcohol abuse, tend to focus narrowly on behaviors that may lead to specific health problems. Interventions trace the causes or risk factors of the health problem and attempt to mitigate the effects that lead to the problem. When this approach occurs in isolation of the greater complexity of an individual's or a community's life, the impacts are limited, if any, and even discouraging when expectations are raised and not met.

Fortunately, a shift in designing interventions has moved towards seeking culturally-responsive solutions that require working closely with communities, their perceptions of the problem, and their values. Grounding an intervention in culture and people's values is particularly important when the desired outcome of an intervention is behavior change.

For community-based interventions aimed at improving food security and dietary quality in Yup'ik communities, it is essential for research partners from outside the intervention community to gain an understanding of Yup'ik ways of viewing health and wellness to align the intervention with local perceptions and to draw upon existing strengths. This literature review is the first step in the direction of understanding the contribution of culturally important foods to well-being from the Yup'ik perspective.

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Chapter 2 Exploring the connection between salmon and well-being to strengthen a food system intervention in Western Alaska

2.1 Introduction

Reduced consumption of traditional foods in indigenous communities has been linked to increases in chronic disease risk (Popkin & Gordon-Larsen, 2004). To address this dietary trend, there is growing interest in promoting nutrient-dense, culturally significant foods produced or harvested locally as part of nutrition interventions (Englberger, Kuhnlein, et al., 2006; Kaufer et al., 2010; Kuhnlein et al., 2013). Because people's behaviors and interactions with culturally significant foods are embedded in cultural perceptions and local contexts, it is important for nutrition interventions to address local perceptions of these foods (Damman et al., 2008). Although nutrition interventions in indigenous communities have included the provision and promotion of culturally-significant foods, few studies elaborate on the process of how to incorporate local perceptions of these foods into the interventions. Participatory, culturally-appropriate approaches used in other public health fields can offer promising insights for how to develop interventions that address dietary change in indigenous communities. This paper shares one approach to using a formative research process to explore and apply local meanings of a culturally significant food to a nutrition intervention in an Alaska Native community.

2.2 Background

2.2.1 Traditional food systems interventions as a response to nutrition transition

Indigenous peoples worldwide, including remote communities in the circumpolar north, have experienced the effects of a nutrition transition, which is a shift from a diet based on traditional, locally harvested foods from the land, sea, and sky to "market foods" that are brought from outside the community as part of the market-based economic system (Kuhnlein et al., 2004). The negative health consequences of this nutrition transition include changes associated with a rise in obesity and non-communicable chronic diseases such as cardiovascular disease and diabetes (Popkin, 2008; Popkin & Gordon-Larsen, 2004).

Kuhnlein et al. observe that in general, "the dietary changes indigenous peoples undergo are neither planned nor directed," but rather result as a consequence of environmental change,

socio-economic, or socio-political changes (Kuhnlein & Receveur, 1996). Global and national policies that artificially lower the price of highly processed, shelf-stable goods and government-subsidized food assistance programs have indirectly contributed to an increased consumption of market foods in indigenous communities by making these lower-quality foods the most economical choice (Damman et al., 2008). When market foods provided by these food assistance programs replace traditional local food options in the diet over the long-term, this diminishes the importance of the traditional food system (Damman et al., 2008; Morrison, 2006). It also dissuades youth from learning traditional skills for harvesting, producing, and preparing these foods. The resulting disruption in passing on specialized cultural food knowledge to future generations can further exacerbate the nutrition transition by increasing reliance on imported foods.

The public health challenge posed by nutrition transitions in indigenous communities highlights the importance of developing effective nutrition interventions. There is increased interest for these interventions to strengthen local and traditional food systems and promote culturally significant foods as a means to improve dietary quality.

2.2.2 Exploring local perceptions of food and well-being to strengthening interventions

Nutrition interventions that target the promotion of culturally significant foods offer an effective approach to strengthening local food systems and addressing dietary change in a number of ways. For one, such interventions emphasize culturally-significant foods that are already familiar and preferred by many community members. These interventions are strength-based in that they draw from existing economic, environmental, and cultural systems that are already in place to support the production and preferential consumption of these foods (Englberger, Kuhnlein, et al., 2010; Lee et al., 2002).

An intervention that promotes culturally significant foods also supports local economic activities. Although tensions exist between the traditional role of culturally significant foods as a gift to be shared as part of a subsistence economy rather than a commodity of a market-based economy, it can be argued that federally-subsidized food assistance programs should prioritize locally harvested foods that are already commercialized and would otherwise be exported from the community (Damman et al., 2008). Interventions that promote local foods purchased by

federally-subsidized food assistance programs have the potential to create a new market for local foods to prefer and support local economies that contribute to the local food system (Meter & Rosales, 2001). Especially promising are findings from school-based farm-to-cafeteria programs in the state of Oregon that indicated a multiplier effect of local purchases that led to an overall increase of $1.86 spent in the Oregon economy for each dollar spent by school districts (Kane, et. al, 2010).

Additionally, promoting culturally significant foods recognizes the merits of local food knowledge and supports people in the community who are involved in the production, preparation, and distribution of these foods. Traditional knowledge and practices of utilizing local natural resources as food and medicine are an inherent part of maintaining local food systems (Hassel, 2006; Milburn, 2004). Interventions that promote local, culturally important foods acknowledge the value of existing knowledge and experience of how to harvest, prepare, and process local foods. By drawing on this intellectual resource connected to foods, food system interventions facilitate the intergenerational transmission of cultural food knowledge and practices.

Finally, promoting culturally significant foods reinforces the cultural and community values connected to these foods. For indigenous cultures, participation in the local food system supports cultural values linked to non-physical aspects of well-being that include psychological, social, and spiritual well-being (Kuhnlein, et. al, 2006; Morrison, 2006; Milburn 2004).

2.2.3 Food system interventions: Strategies and approaches

Formative research to explore local perceptions of culturally significant foods and their relationship to health and well-being offers a promising way to guide the development of an intervention (Comer & Dutta, 2009; Gittelsohn et al., 1996; Gittelsohn & Rowan, 2011; Mead et al., 2012). By investigating local understandings of well-being and integrating these perspectives into the intervention design, a food system intervention can comprehensively support the diverse contribution of cultural foods to community and individual well-being beyond physical health benefits. Research findings about local understandings of the relationship between foods and well-being can then inform the intervention design to align with existing community values.

Overlooking local understandings of health in nutrition interventions based on scientific models may limit an intervention's effectiveness (Mundel & Chapman, 2010). The integration of indigenous ways of knowing with evidence-based strategies is key to shaping the formative research and intervention design process to address nutrition transition in indigenous communities (Cochran 2008; Smith, 1999). Evidence-based health interventions arise from a Eurocentric biomedical framework based on Western science and an emphasis on physical health by examining the relationship between components of food and biophysical processes that can prevent or cause disease (Milburn, 2004). By contrast, local understandings of health in indigenous communities arise from integrated, holistic, place-based worldviews that are connected to local value systems and address the spiritual, social, cultural and economic contexts of a person's life (Mohatt & Elk, 2002; Wolsko et al., 2006). Spiritual connections to the natural world and reciprocal relationships also contribute to well-being as a part of this worldview (Milburn, 2004; Wolsko et al., 2006).

Principles found in indigenous research methodologies and indigenous evaluation frameworks offer helpful planning tools because these methodologies explore how to design and evaluate a program based on desired outcomes, available resources, and program objectives by drawing on both indigenous and Western epistemologies (LaFrance, 2004; LaFrance & Nichols, 2008; Smith, 1999). The critical role of culture and context, a respect for place-based programming, and a connection to the community are three principles that can strengthen food system interventions in indigenous communities. Formative research to examine indigenous perceptions and cultural values related to health and well-being therefore is a necessary step in designing a health intervention.

A growing number of successful food interventions have been implemented in indigenous communities worldwide (Afele-Fa'amuli et al., 2009; Dwyer, 2010; Englberger, Lorens, et al., 2010; Hassel, 2006). Although each intervention differs in specific objectives and cultural contexts, shared elements provide insight that can inform the process of designing interventions based on local perceptions and meanings of food. For example, many of these interventions focused on promoting traditional foods by providing these foods as part of their program, such as in the school cafeteria or in commercial outlets (Englberger, Kuhnlein, et al., 2010; Kaufer et al., 2010). These interventions also promoted traditional foods through

educational programming, social marketing campaigns, community activities, cooking classes, and/or relevant trainings to promote local food production (Dwyer, 2010).

Because a food systems approach requires understanding the context of dietary behaviors of a particular place or group of people, a collaborative process between outside researchers and community members contributes to the intervention development (Goodman et al., 2000). This essential component is consistent with approaches used in community-based participatory research (CBPR), culture-centered interventions, and indigenous research methodologies. This process entails creating a space to listen and engage in dialogue with community members about local perceptions and meanings of health and well-being (Dutta, 2008; Israel et al., 2001; LaFrance & Nichols, 2008). A collaborative process will also involve mechanisms for feedback to ensure that the emerging intervention design aligns with the community's perceptions of food.

Successful food system interventions that have been implemented by agencies external to the community also worked with a community partner and/or organization to understand and adapt the intervention to local needs and community priorities. Academic and community partners collaborated during the formative research and planning processes by participating in workshops, planning meetings, interviews, and other opportunities for ongoing communication and feedback between all stakeholders (Englberger, Kuhnlein, et al., 2010; Sharma, 2010). For interventions implemented by Native American tribal organizations, the Food Sovereignty Assessment Tool compiled by The First Nation Development Institute was recommended in reports to inform the planning process according to community needs and perspectives (Bell-Shetter & First Nations Development, 2004; Jackson, 2012; LaDuke, 2012).

The initial findings from these interventions have been positive in terms of improving dietary outcomes and improving attitudes towards culturally important foods (Kaufer et al., 2010; Mead et al., 2012). Traditional food programs initiated by Native American tribal organizations such as the White Earth Land Recovery Project (WELRP) in Minnesota have also experienced long-term sustainability and expansion of their programming (Jackson, 2012; LaDuke, 2012).

Although local food system interventions that promote culturally significant foods have been found to benefit the health and well-being of communities, the process of building interventions around local perceptions of the connection between these foods and well-being is

rarely shared as a part of intervention development. This paper will contribute to an emerging body of literature on food system interventions in indigenous communities by sharing our process of understanding and applying local meanings of a culturally significant food into a food system intervention. By intentionally designing food system interventions to include local understandings and values related to traditional foods, it is hoped that this paper offers an approach to improve health for indigenous communities.

2.3 Manuscript objectives

This manuscript describes the process of applying local perceptions and values of a culturally important food into the intervention design by examining a food system intervention to promote intake of salmon among youth in a Yup'ik community of Southwestern Alaska. The paper will describe two phases of the intervention development: 1) a formative research phase designed to understand local perceptions of salmon's connection to health, and 2) the process of incorporating formative research findings into the intervention design. It is hoped that the challenges and opportunities discussed from this process can inform future food system research and health interventions in indigenous communities and other cross-cultural contexts.

2.4 Methods

2.4.1 Study overview

In phase 1 of the process, qualitative data from a ten-member work group were collected to understand local perceptions of the relationship between salmon and well-being. In phase 2, the findings from phase 1 were applied into the intervention design.

2.4.2 Fisheries-to-School, a food system intervention

Fisheries-to-schools (F2S) is a food system intervention designed to address concerns expressed by community members that young people of the Yukon Kuskokwim Delta region are becoming increasingly removed from a traditional nutrient-dense fish-based diet (Ballew et al., 2006; Bersamin et al., 2006; Johnson et al., 2009). The goals of the intervention are to increase students' fish consumption during the school lunch and at home by reconnecting school children with their local food system. Salmon is chosen for the intervention as the target species because

it is both a traditional food and a commercial local product that could be served in school lunches under food service regulatory guidelines. Salmon's historical role as an important natural resource and one of the few sources of income in the YK Delta is well understood and well-represented by a variety of reports and studies in the fields of natural resource management, fisheries, and economic development (Fienup-Riordan et al., 2013; Fienup-Riordan et al., 2005; Loring, 2007; Loring & Gerlach, 2010). The financial contribution of salmon to local livelihoods and community well-being is an essential consideration for a food system intervention aimed at reconnecting young people with local culturally-important foods.

The general structure of the F2S intervention includes components modeled on Farm-to-Cafeteria interventions that have been widely implemented throughout the United States (Feenstra, 2012). These school-based food system interventions share structural similarities in their programming: 1) provision of local product in school cafeteria meals, 2) food system lessons in the classroom, and 3) hands-on learning opportunities inside and outside of the classroom.

Although Farm-to-Cafeteria has been implemented in indigenous communities of the lower 48, the F2S intervention is the first time such a program has been adapted for use in Alaska Native communities (Dwyer, 2010). Adapting the intervention requires understanding the context of how the traditional foods fit into the wider community's food system beyond its nutritional benefits.

The food system in rural Alaska Native communities is distinct for its basis in a mixed subsistence-cash economy. Traditional foods, such as salmon, are directly harvested from the natural environment, processed locally, and distributed through non-market economic channels (Loring & Gerlach, 2009; Wolfe, 2004). Market foods, such as the food served in the school cafeteria, are sourced from non-Alaskan producers and purchased through industrial-scale commercial food supply chains. As an intervention to encourage youth to increase consumption of traditional foods, an understanding of the connections between local people's well-being and culturally important foods is needed to guide intervention development (Gittelsohn et al., 1996).

The process of incorporating local perceptions and values of a culturally important food into the F2S program was completed in two phases. Phase 1 conducted formative research with a community work group to explore local perceptions of well-being connected to salmon. Phase

2 involved the process of using findings from Phase 1 to strengthen the F2S intervention through continued work with the community work group whose members participated throughout the intervention development process.

2.4.3 Geographic context

Formative data were collected in one remote Yup'ik community in the Yukon Kuskokwim Delta over a period of five months in 2013. The community is one of over fifty villages served by the Yukon Kuskokwim Health Corporation in a region of southwestern Alaska that is roughly the size of the state of Oregon. About 28,000 people live in this region that is the traditional homeland of Yup'ik, Cup'ik, and Athabascan people. Approximately 82% of residents in this region are all or part Alaska Native with over 21.5% of the population living below the Federal Poverty Level (Yukon-Kuskokwim Health Corporation, 2014).

Like many other remote areas of Alaska, community members lead a subsistence lifestyle and actively participate in activities such as hunting, fishing, and gathering food from an environment rich in wild food resources. A diversity of fish contribute to the Yup'ik diet throughout the year. Recent dietary studies in the region have shown that fish and seafood continue to be important sources of energy, protein, mono- and polyunsaturated fatty acids, selenium, magnesium and vitamins D and E (Ballew et al., 2006; Bersamin et al., 2006; Johnson et al., 2009).

Commercial fishing and working at the local fish processor provide a major source of cash income in the summer for most residents of this region (Wolfe & Spaeder, 2009). Other local employment opportunities include work at the school, clinic, water plant, energy plant, grocery store, city and tribal government, and construction.

Due to a topography characterized by tundra and riparian mudflats, year-round access to the community is limited to air travel via small planes. Summer conditions allow water transport via small boats and snow machine travel in winter. All modes of transportation are expensive with gasoline prices averaging at $8 per gallon during the time of study. The cost of transportation affects the price of market foods that are shipped in via barge or plane. It also affects the cost of transportation to travel to harvesting areas for subsistence activities.

2.4.4 Participant recruitment

A local program coordinator was hired to assist with intervention development and implementation activities. The coordinator was a college-educated Yup'ik resident who was born and raised in the community. The local coordinator was an active participant in subsistence activities and the local traditional dance group. His background in fisheries management science and interest in working with children at the local school were additional strengths he brought to the project team.

A community work group was formed to collaborate with the academic research partners for designing and implementing the intervention. A purposive sampling strategy was used to recruit work group members. Potential members were invited by the local program coordinator.

Selection criteria required that potential members be residents of the community and interested in improving the health of young people. The sampling strategy allowed a diverse representation of perspectives by age, sex, and occupation. Ultimately, the work group members included an Elder, tribal council members, city government, former and current teachers, parents, high school and university students, representatives from the fishing and business development sector, and other respected community leaders. The work group consisted of 10 members. Refreshments and a small honorarium were provided to compensate participants for their time at meetings.

2.4.5 Phase 1: Exploring perceptions of salmon and well-being

2.4.5.1 Data collection

Qualitative data were collected through a focus group to explore perceptions of the ways in which salmon promotes health and well-being in a Yup'ik community. Eight (n=8) work group members attended a two hour meeting during which the focus group was conducted. The focus group was selected as a qualitative method to efficiently utilize the limited resources and time available to the research team for travel to the community by meeting with many people at once. Focus groups also provided a comfortable setting among community members whose long-standing relationship with the region, subject matter, and shared experiences encouraged rich discussion (Krueger, 2009). Because of the democratic and community-oriented characteristic of

Yup'ik culture, previous studies in the region indicated focus groups to be a more effective data collection method with Yup'ik community members than other qualitative methods, such as interviewing (Hopkins et al., 2007; Mohatt et al., 2004; Wolsko et al., 2006).

For the F2S program to encourage students to increase overall fish consumption, both at school and at home, it was necessary to explore the ways that salmon already contributed to the well-being in the community. The first community work group meeting set the stage for the research team and work group collaboration by discussing the participants' values and vision for the intervention.

The focus group was a discussion facilitated by the lead author in response to the question "How does salmon promote a good life in this community?" While this question focused specifically on salmon, the cultural food selected for the intervention, it was designed to be broad enough to capture physical, psychological, social, economic, environmental, cultural/spiritual dimensions of well-being.

Following free-responses, the facilitator recorded key words from the conversation and verified with the community work group members that these key words captured the main themes of how salmon promoted community and individual well-being. These themes were recorded and used as a guide for further analysis of the recordings.

2.4.5.2 Data management and analysis

Following the workshop, the audio recording from the focus group was transcribed verbatim and subjected to thematic analysis. Coding software was not used; however, an initial codebook was developed based on themes generated by the work group during the focus group. The list of key concepts generated by the work group served as a starting point for identifying salient themes that link salmon to "a good life." An inductive approach to analysis used principles of grounded theory to further analyze transcript data and check against the initial themes (MacQueen et al., 1998). Techniques of consensual qualitative data analysis were employed to organize selected quotes into the thematic categories and operationalize the themes (Hill et al., 2005). The local community coordinator and an outside academic partner assisted with member-checking by reviewing the codebook and transcript to ensure rigor and trustworthiness of the data analysis.

2.4.6 Phase 2: Applying local perceptions to intervention design

2.4.6.1 Data collection

Nine additional work group meetings were convened during which findings from the focus group at the initial meeting were incorporated into the intervention design. An average of six members were present at each meeting. Each meeting addressed how to incorporate local perceptions of salmon into one or two of the intervention components. Detailed meeting summaries were recorded and shared with work group members and academic partners who were not present to keep all collaborators informed and provide opportunity for additional feedback. Ethnographic data, including detailed meeting summaries, were collected to keep track of how findings from Phase 1 were incorporated into the Phase 2 intervention design.

2.4.6.2 Intervention development process

After each meeting, the principal investigator met with university and community research assistants to jointly review meeting summaries and work together on incorporating the work group's recommendations into the intervention component under discussion.

2.4.7 Research ethics

This study, [#372775-4] was approved by the Institutional Review Board at the University of Alaska Fairbanks. Additional approval was granted by the Human Subjects Committee at the Yukon Kuskokwim Health Corporation, which is the primary service provider for communities in the region. Informed consent and permission for meetings to be photographed and audio-recorded was obtained from all study participants. Confidentiality of the study locations will be maintained out of respect for the community's privacy until approvals have been have been secured by tribal councils, local government, and permission from nonpolitical community leaders, including elders.

2.5 Results/Findings

2.5.1 Phase 1: Connection between salmon and well-being

During the focus group, work group members discussed ways that salmon contributes to the well-being of young people and to the community. Nine major themes emerged from the analysis of the focus group discussion that represented diverse aspects of well-being that are supported by salmon beyond its contribution to physical health. These themes are: 1) family, 2) traditional life skills, 3) *neqpik*: real food, 4) support local livelihoods, 5) pride, 6) hard work, 7) connection to the environment, 8) social connection, and 9) gratitude.

2.5.1.1 Family

The first theme emphasized family as an important aspect of well-being supported by salmon. Participants shared that the salmon fishing season represented a special time during which some families live at seasonal fish camps to harvest and process fish for the winter. One participant observed, "Salmon and salmon fishing strengthens family life" because intergenerational members of the family lived and worked together toward a common goal of harvesting fish for winter. Family unity and harmony were described as being highly valued as important aspects of well-being.

2.5.1.2 Traditional life skills

Another theme highlighted salmon's role in providing opportunities to teach youth important traditional knowledge and life skills as both short-term and long-term contributions to well-being. Engaging young people in fishing-related activities allowed them to gain the firsthand knowledge and experience of setting nets and learning good places for fishing. One participant expressed the value of teaching young people traditional and contemporary fish-related knowledge. "It's been passed down for a long time," he explained. "We're passing down our tradition of preparing for winter." This theme emphasized the transmission of traditional ecological knowledge and life skills that contribute to well-being from one generation to the next.

Participants also highlighted the contribution of these skills to survival situations and self-reliance. One person explained, "If you break down somewhere and nobody knows where you're at, how are you going to survive? We run out of food. But if you have a net, you'll always have some food." Because foods at the local store were expensive and depended on distribution networks based outside the community, having the knowledge and ability to harvest fish and other subsistence foods helped supplement a family's food supply and contributes to physical well-being.

2.5.1.3 Neqpik: Real food

Participants also valued salmon as *neqpik*, which means "real food" in Yup'ik. The word *neqa* translates into a general term for "food" as well as "fish," which signified the importance of fish in the traditional diet of the Yup'ik people (Morrow & Hensel, 1992). This theme highlighted salmon as a nutritious and culturally preferred food. Participants emphasized the ability of salmon and other traditional foods to satiate one's appetite in contrast to some market foods that left a person hungry soon after eating. Other participants spoke about different ways to prepare salmon, such as boiled for a nutritious fish broth or dried for a snack while traveling and doing other subsistence activities. One participant observed that "our ancestors' diets were composed mainly of fish." He added, "Maybe our bodies aren't prepared for the high sugar, high sodium products at the store," suggesting that these traditional foods were better suited to their bodies than market foods.

Participants also mentioned the importance of knowledge about traditional rules for eating local foods, a Yup'ik concept called "*nernerrluk*." For example, one participant shared that a person who is severely ill or recovering from serious illness should abstain from eating foods considered to be heavy or rich, such as king salmon. Such foods are traditionally considered to interfere with or slow the healing process. This traditional knowledge represented specialized local understandings and behaviors related to salmon's connection to physical well-being.

2.5.1.4 Support local livelihoods

The ways that salmon supported local livelihoods was a theme that emphasized economic well-being. Livelihoods can be defined as "the capabilities, assets including materials and social

resources, and activities required for a means of living" (Department for International Development, 1999). Work group members emphasized salmon's importance to the mixed cash-subsistence economy. Salmon contributed to the cash economy as an income-generating activity. "A lot of the local economy depends on how the fishing goes," observed one community member. "[Fishing] provides opportunities for employment." As part of the subsistence economy, harvesting and processing one's own salmon contributed to household food security. "It provides a staple food for winter," pointed out one work group member. "You're saving money because you're putting food away for the winter, and then that's something you don't have to buy," said another work group member.

2.5.1.5 Pride

Work group members emphasized salmon as a source of great pride for the community because salmon provided an important local source of income for many families. "Our salmon is world famous and the quality of the fish is appreciated around the world," explained one participant. Salmon from the community is exported to the lower 48 states and abroad and is particularly recognized for its health benefits and culinary qualities due to its exceptionally high levels of Omega-3 fatty acids (Kwik'pak Fisheries, March 27, 2014). As described, salmon was viewed as contributing to the community's well-being because it made a positive contribution to the community's identity.

2.5.1.6 Hard work

Salmon also contributed to the value of hard work and the concept of "keeping busy" that addressed physical and psychological dimensions of well-being. Participants considered the daily tasks required of living in a camp away from the conveniences of the village to be health-promoting activities because it kept people active. These activities included fishing, cutting and smoking fish, taking care of fishing gear, gathering wood for the smokehouse, tending the smokehouse, fetching water, sharpening knives, and other tasks. Participants spoke positively about the benefits of salmon-related activities. "Learn how to fish, then you'd be busy all the time. You wouldn't have to worry about a recreation center," commented one participant. "If you're not doing something, you're watching TV, just sitting there doing nothing."

Hard work with salmon-related activities was attributed to promoting psychological and mental well-being. “Getting salmon it’s like a good distraction, keeps your mind off the world,” said one participant. By being involved in fishing activities, a person’s mind was focused on the task at hand rather than other preoccupations. This theme emphasized how engagement in subsistence and commercial salmon fishing activities that require hard work and keeping busy was viewed as promoting physical and psychological well-being.

2.5.1.7 Connection to the environment

The theme of a connection to the environment linked salmon to well-being by fostering a connection to the natural environment, both local and global. When engaged in fishing activities, participants mentioned, “You have to be aware of what’s going on in the environment and the ocean and the river.” In this way, participants considered community members’ connection to the environment through subsistence salmon fishing as a dimension of spiritual well-being. One participant commented, “There’s a sense of respect for the land, a relationship to nature.”

Participants also observed salmon’s role in connecting the community to the global environment. “Salmon spend a large part of their life cycle way out, way beyond Alaska and so what happens to them out there affects us directly. Salmon gives us a connection to the larger world.” According to participants, salmon contributed to spiritual dimensions of well-being by promoting the Yup’ik value of connection to the local and global environment.

2.5.1.8 Social connection

Salmon was also described as promoting social aspects of well-being by strengthening social connections among community members. As one participant explained: “Fishing is like a common goal that ties everyone together. The whole town is thinking about it, catching fish. They’re all striving for one direction.”

Another community member interpreted salmon’s contribution to well-being. “It teaches you to be a provider for your family, learning to be independent instead of dependent. But then it teaches you to be interdependent, like other families providing for others like at funerals.”

Salmon was also seen as promoting social well-being through its role in the Yup’ik tradition of sharing and hospitality. One participant shared, “When guests come, you know you want to share the best you have and offer them some salmon.” Participants spoke about how

salmon and other subsistence foods were shared at community events during times of celebration and times of mourning. Salmon was shared with elders and others who are unable to fish for themselves. Salmon was also mailed or delivered to family members and friends who reside outside the community. “Even my mom, you know, gets lots of calls from my aunts to send fish to Juneau [an urban center],” said one participant.

2.5.1.9 Gratitude

Another participant mentioned salmon in the connection to “the value of being thankful, being thankful for what the land has to provide.” Salmon promoted this value by reinforcing the relationship between people and the environment and also the relationships people have with each other when they share salmon. Gratitude was described as contributing to social, psychological and spiritual well-being.

2.5.2 Phase 2: Applying the findings to the F2S intervention

2.5.2.1 F2S intervention development: A conceptual model

The F2S intervention was shaped by an iterative, collaborative process that applied findings from Phase 1 to identify local perceptions, values, and priorities into the final design of the intervention’s components. As with similar culture-centered approaches to health interventions and programmatic processes, the process of developing this intervention is best illustrated by a community-centered conceptual model based on a cultural object or concept that is unique and meaningful to the community (LaFrance & Nichols, 2008; Mohatt et al., 2004).

Below, Figure 1 is a conceptual model developed with and illustrated by the F2S community coordinator to convey the process of developing the intervention using findings of the formative research study. The conceptual model used the metaphor of a gillnet, which is used in the region for commercial and subsistence salmon fishing (Fienup-Riordan et al., 2013; Kawagley, 1995).

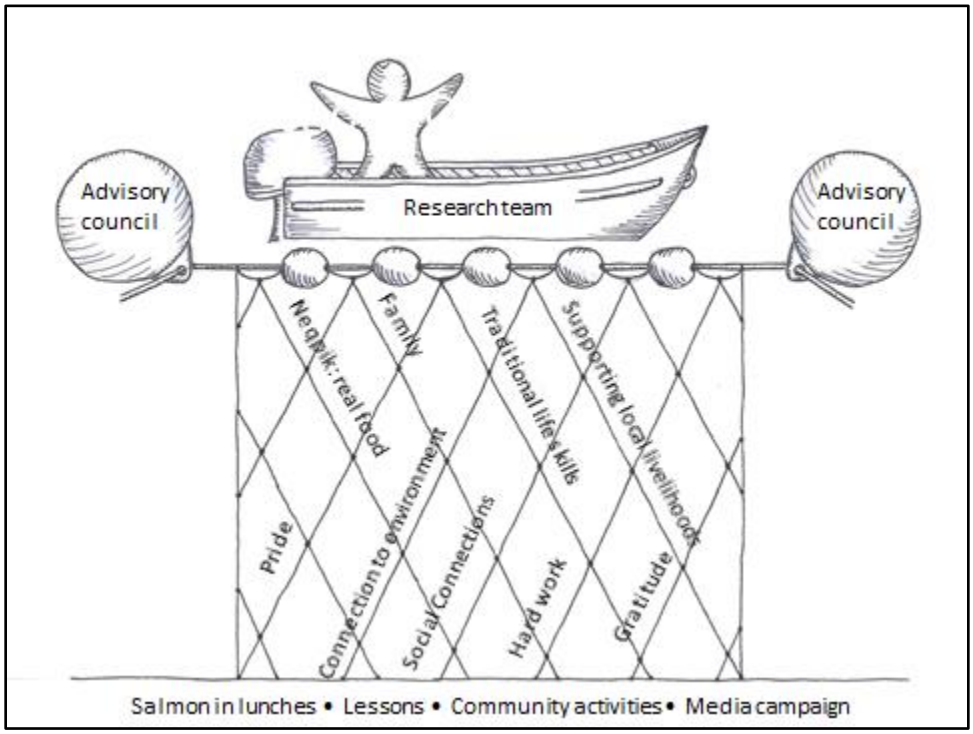

Figure 1. Fish-to-School conceptual model

In this model, the intervention components were situated in the net's lead line, which held the net open under water and symbolized the core structure of the intervention. The intervention components included salmon lunches, lessons, community activities and media campaign.

In actuality, the size of a net's mesh determines the size and type of fish that a fisherman is able to catch. Findings from Phase 1 of the study were represented as the net's mesh in the conceptual model because community perspectives on salmon's connection to well-being were incorporated into the intervention's design to capture the desired outcome of changing dietary behavior to favor local salmon and other traditional foods. The themes related to multiple dimensions of well-being promoted by salmon formed a central role in restructuring the intervention to reflect the context of community's relationship to salmon.

The surface level components of the conceptual model represented the actors driving the intervention design. The buoys and floats represented the work group members who ensured that the program stayed true to the themes represented by the net. During the initial phases of formative research, intervention development and implementation, the research team played the role of driving the boat and guiding the intervention research process. Following the conclusion

of the F2S intervention, the research team will transfer the intervention design and study findings into community hands during the dissemination phase of the larger study. The community will then assume the role of driving the boat and setting the parameters of the net to capture the desired health outcomes.

2.5.2.2 Refining the F2S intervention

Through continued collaboration with the work group, the F2S intervention components were refined to align with findings from the formative research phase. These components included: 1) salmon in the school lunches, 2) lessons, and 3) community activities and media campaign.

Table 1 summarizes how the themes that connected salmon to well-being were integrated into the intervention's components.

Table 1: Integrating phase 1 themes into the F2S intervention

Intervention Component	Activity	Theme	Anticipated outcome
Salmon in the lunches	Source local salmon	Support local livelihoods	School purchases fish from local processor thereby creating new market for the processor and enhancing its sustainability.
		Gratitude/ Social connection	Students appreciate contribution of community members to their lunch.
	Adapt local salmon recipes for cafeteria menu	Neqpik	Recipes reflect traditional food preference.
		Pride	School values community salmon recipes.
Lessons	Demonstrate environmental, nutritional, and economic impacts using a comparison of local and non-local food supply chains	Pride	Students recognize benefits of local fish and subsistence foods.
		Social connections	Students understand how salmon brings community members together.
		Connections to environment	Students understand how food choice affects the environment.
		Support local livelihoods	Students recognize benefits of participating in subsistence activities and eating subsistence foods.
		Neqpik	Students learn about *nernerrluk*, specialized Yup'ik food knowledge.
	Include local images and community-specific scenarios in curriculum materials and content	Pride	Students create advertisements that highlight the environmental, cultural, and health benefits of local salmon.
		Social connections	Students recognize the ways that salmon is exchanged through local sharing networks.
		Connection to the environment	Board game highlights the importance of conservation and a clean environment for managing sustainable salmon populations.
		Gratitude	Students appreciate community members' and their own contribution to the local salmon industry and subsistence lifestyle.
		Hard work	Lessons highlight the value of students' participation in salmon and subsistence-related activities.
		Family	Students recognize the benefits of knowing the people who are involved in harvesting and preparing their food, including family members.

Table 1: Integrating phase 1 themes into the F2S intervention (continued)

Intervention Component	Activity	Theme	Anticipated outcome
Community activities and media campaign	Design activities to be intergenerational and family-friendly	Family	Community members and families participate in activities .
	Offer cooking lessons	Traditional skill development	Students develop skills in cooking contemporary and traditional salmon recipes.
		Hard work	Students understand the process and work required to prepare a meal.
		Pride	Students feel pride for their accomplishments and new skills.
	Integrate reciprocity into activities	Social connection	Student and community-generated materials for media campaign recognizes student learning and creativity.
		Gratitude	Activities provide opportunities for participants to give salmon to elders.

2.5.2.2.1 Salmon in the school lunches

As part of the F2S intervention, locally-sourced chum salmon, *sp. Oncorhynchus keta*, will be served three times a month in the school lunch throughout the academic year. In congruence with findings from Phase 1 that emphasized the importance of supporting local livelihoods, the fish will be purchased from a community-based organization whose fish processor provides significant employment opportunities for residents throughout the region (Kwik'pak Fisheries, March 21, 2014). Family members of nearly all students including some students themselves work for this processor in the commercial fishing sector as fishermen, processor workers, and support services. In this way, the school lunch component will support salmon's role in reinforcing social connections by connecting students with fish produced by members of their own community.

This component of the intervention also involves working with cooks and community members to adapt local household salmon recipes for the school lunch cafeteria setting. The work group emphasized the importance of salmon as *neqpik*, or Yup'ik food and to prepare salmon in the cafeteria using recipes that reflect the way salmon is prepared in local homes. It is

hoped that students will be more likely to eat the salmon in the school lunch if the recipes are familiar and cater to local palates rather than recipes developed for urban palates. Part of the effort will involve weekly communication with school district cooks for feedback on the salmon lunches as well as soliciting salmon recipes from community members during community activities. This intervention component will result in a set of standardized local salmon recipes approved by the National School Lunch Program to be used in any school lunch cafeteria setting.

2.5.2.2.2 Lessons

Place-based education connects education to the physical and cultural environment in a way that can also foster civic responsibility (Barnhardt, 2005). Respected Alaska Native scholars have promoted the implementation of place-based education and the incorporation of local values and worldviews as a synergistic approach to effectively teaching Western academic subject matter in rural Alaska Native communities by drawing upon both Western and Alaska Native ways of knowing (Barnhardt, 2005; Kawagley, 1995).

The F2S intervention developed five interactive lessons that will be taught to middle and high school students in the intervention community. The lessons aim to promote awareness of how food choices affect personal, environmental, and community well-being. The themes that addressed multiple dimensions of well-being promoted by salmon during the formative research phase will be incorporated into the lessons to make the content more relevant to the students' lived realities as a way to better encourage desired behavior change. Throughout the lesson development, the work group will provide input to ensure that the themes of salmon's connection to well-being are reflected in the curriculum.

One example of this collaboration will be the modification of existing food system curriculum developed by the Johns Hopkins Center for a Livable Future to teach students about the United States food system. This type of food system is based on market foods that are produced largely by agricultural food supply chains in the lower 48 states. In an effort to emphasize salmon-related life experiences discussed during Phase 1, these food supply chain lessons based on agriculture will be modified to reflect food supply chains based on wild-harvesting local resources, namely salmon. Curriculum content will be developed to compare three distinct supply chains that were relevant to the community's food system: local commercial

salmon supply chains, local subsistence salmon supply chains, and non-local food supply chains. These lessons promote pride by encouraging students to recognize the benefits of local fish and subsistence foods. They also highlight the social connections that supported the harvest, processing, and distribution of local subsistence salmon. The lessons will teach students about how food choice is connected to the environment and how their food choices and involvement with subsistence can support local livelihoods.

At the request of the F2S work group, an additional strategy to make the curriculum more place-based involves the inclusion of photos of local places and people along with community-specific scenarios for curriculum materials. This strategy addresses several themes from Phase 1. One lesson promoted pride with an activity in which students created advertisements that highlight the environmental, cultural, and health benefits of local salmon. A board game to demonstrate the flow of different resources in the community reinforces social connections by demonstrating how salmon and cash are exchanged as part of the mixed subsistence-cash economy. Special cards called "Quyana" cards are also used as a social currency to illustrate how goodwill fosters relationships of reciprocity in the local economy. The situations encountered by the players during the course of the game will be co-developed by the researchers and the work group to reflect events and choices that are unique to the region and recognizable to the students' everyday lived experiences. These situations provide an entry point to emphasize the themes of gratitude, hard work, and family in connection to salmon's importance for individual and community well-being.

To address the themes of connection to the environment, traditional skills development, and *neqpik*, another lesson in the form of a trivia game will test students' knowledge about the environmental, health, economic, and cultural facts about specific store-bought and subsistence foods. Some questions will be developed via facts found in research-based resources. Feedback from the work group will be used to develop questions based on salmon-related cultural values, practical knowledge, and *nernerrluk*, specialized Yup'ik food knowledge.

Overall, continuing to work with the work group in adapting the lessons to incorporate findings from the formative research phase will result in the development of culturally-relevant, place-based lessons that promote salmon and multiple dimensions of well-being.

2.5.2.2.3 Community activities and media campaign

Continued coordination with the work group and existing community groups also enabled the formative research findings to be incorporated into developing the intervention's community activities and media campaign. Community activities include a local fish-themed scavenger hunt, a food-themed film festival with a facilitated discussion, culinary classes, and a community celebration. The family theme influenced the design of all community events to be intergenerational and family-friendly. In accordance with the theme of life experiences and skills development, the culinary training and community cook-off will utilize locally-sourced salmon to teach skills for preparing traditional local recipes and contemporary regional recipes. This activity also promotes hard work in students by giving them firsthand experience to recognize the effort required to prepare a meal. The cook-off activity provides a venue for the community to celebrate students' salmon-related knowledge and cooking skills.

Reciprocity can be defined as a cyclical relationship between two entities in relationship with each other, such as in nature or between people, which involves giving back or redistribution of tangible and intangible assets to maintain balance and kinship ties (Harris & Wasilewski, 2004). The themes of social connection and gratitude are applied in the form of reciprocity activities during the community events and media campaign. In following the value of social connections, the media campaign will utilize materials generated from the participants at the scavenger hunt and student assignments for lessons to promote eating local salmon at school and at home. For instance, a key piece of the media campaign will utilize advertisements for local fish that teams of students create during the salmon lessons to communicate the environmental, health, economic, and cultural benefits of salmon. This activity is designed to celebrate student learning and creativity as posters will be made to display around the community while allowing the students to share their new knowledge about salmon's benefits with others in their community. To address the theme of gratitude during the community scavenger hunt, salmon will be provided to participants to share with elders in appreciation of their knowledge and wisdom.

Overall, the process of incorporating a wider range of community voices into the health promotion materials strengthens the program's core messages while celebrating Yup'ik values and local participation in the intervention.

2.6 Discussion

Because traditional foods in indigenous communities have been established to be intricately linked to the economic, social, environmental, and spiritual contexts of a community, the formative research phase (Phase 1) was an important step in the F2S intervention design process (Gittelsohn et al., 1996). As part of a community-centered approach, the formative research phase allowed the F2S intervention design to reflect local perceptions of the connection between salmon and well-being. This process elucidated the significance of a traditional food that might have otherwise been overlooked in an intervention based solely on a biomedical framework limited to promote only the nutritional qualities of a traditional food. Instead, the process allowed community members' perspectives to strengthen the intervention development by first exploring salmon's connection to multiple aspects of health and well-being, including its economic, environmental, social, and cultural benefits.

A strength of this process involved situating the intervention within the community context to set a foundation for effective and meaningful health promotion (Comer & Dutta, 2009). The development of the F2S intervention connected the importance of salmon to diverse aspects of health. In doing so, the resulting intervention touched upon themes that influence students' decisions, such as knowing the long-term health benefits of salmon. The intervention also emphasized themes that the work group identified as relevant to students' futures, such as developing food preparation skills and understanding how the salmon industry was connected to local livelihoods. In this way, the intervention reinforced and reflected community values by incorporating these themes into the intervention components.

By working closely with the community work group and local research coordinator, the intervention was better able to leverage existing community resources, such as a partnership with another community-based health program. The commitment to incorporating local perspectives and collaboration with the work group also enabled the intervention to gain widespread community support. Local involvement in health promotion activities has been identified as a contributor to an intervention's sustainability beyond its initial grant funding because a greater sense of community ownership of the intervention results from participation in the design process (Cargo & Mercer, 2008; Minkler et al., 2006)

Because the study's sample was purposeful, the findings were specific to the perceptions of the work group members and are not meant to be representative of all possible perspectives within the intervention community itself or other Yup'ik communities. Because our purpose was to collaborate with community members who were interested in being part of the intervention development process, the formative research findings laid the groundwork for this partnership by creating a space for understanding multiple dimensions of well-being supported by salmon which were then used to strengthen the intervention.

Although few studies have focused specifically on the connection between salmon and well-being, the findings from this phase were consistent with other literatures that highlight the significance of salmon and subsistence foods in Yup'ik communities. The themes related to connection, such as social connection and connection to the environment paralleled findings from a qualitative study on Yup'ik conceptions of health and wellness that presented models of healing based on the social and natural connection and models of wellness informed by traditional values (Wolsko et al., 2006). Similarly, a study by Hopkins et al. underscored the importance of family, keeping busy, sharing, and subsistence foods such as salmon to be important components of healthy aging from the perspective of Yup'ik women in the region (Hopkins et al., 2007).

Overall, the findings echoed related literature on the Yup'ik worldview that emphasize the holistic, interconnected nature of well-being beyond physical health and the relevance of culturally-important foods as a part of this worldview (Cook, 2013; John, 2010; Kawagley, 1995; Rearden, 2009).

2.6.1 Lessons learned

Even though the findings cannot be generalized, the broad lessons learned from the process and knowledge gained during both phases of developing the F2S intervention offers insight for a process that involves community members in designing similar food system intervention work in other settings. Using examples of lessons learned during the F2S intervention, we describe potential challenges and recommendations to be considered by other agencies when employing community-centered approaches for designing food system interventions.

2.6.1.1 Strong academic-community partnership.

The establishment of a strong academic-community relationship required a significant initial time investment by academic researchers, local coordinators, and the work group. This proved challenging since field trips to the remote community were expensive, weather-dependent, and required advance preparation and a full day dedicated to traveling. At the invitation of the work group to better understand the community's perspectives on salmon, the lead author lived in the community for a month during the summer salmon season and the F2S intervention development phase. This opportunity contributed positively to the intervention by facilitating efficient coordination between academic partners, the work group, and other community partners. It also helped increase awareness and community support for the intervention by demonstrating a genuine interest and commitment to learning about and participating in community activities related to salmon. A commitment of financial and intellectual resources as well as time considerations are needed for developing a strong academic-community partnership that strengthens the intervention design process (Hoeft et al., 2013).

2.6.1.2 Good communication strategies.

Another important lesson learned from the F2S intervention was finding effective ways for communicating over geographical distances and in cross-cultural contexts. Although in-person meetings were preferable, they were not always possible due to the logistics and expenses of frequent travel to the communities. Unreliable internet and telephone service in the community posed major communication barriers between the academic research team and community partners. Good communication required flexible timelines, patience, and persistence for the research team to adequately stay in touch with the local community coordinator and work group members. Developing good communication strategies is an ongoing process that requires intervention partners to frequently discuss and determine which methods are the most appropriate and to reestablish continued commitment from all partners to stay in communication. For the F2S intervention, a variety of methods were used including text messaging, emails, telephone, videoconferencing, and drop-in visits to people's workplaces and homes when academic partners were in the community.

2.6.1.3 Flexible timelines

Adequate time and flexibility were also necessary to balance the needs of the intervention and research with community members' existing commitments. The flexibility of the F2S research team's timeline and openness to accommodate changes strengthened the process. The formative research took place early enough to allow the findings to be incorporated into the intervention design prior to implementation. Nevertheless, unexpected circumstances, such as emergency school closures and deaths in the community, resulted in delays and scaling back intervention components to fit in the remaining available time. The necessary amount of time may not always be available to other interventions. Agencies that seek to follow this approach must consider making a significant investment of time and funding for the formative research phase and ongoing community collaboration. Flexible timelines are strongly recommended to ensure enough time for in-depth formative research and intervention development along with a time to cushion for unexpected delays.

2.6.1.4 Respectful engagement with diverse stakeholders.

The community work group brought together Elders, youth, and adults for the formative research and intervention development phases. While this enabled the group to include a diversity of perspectives, it was noted that the Elders and youth demographic contributed less to the discussions than the adults. Studies conducted in Yup'ik communities have noted that young people may be reticent to speak in the presence of Elders and older adults as a cultural form of respect (Wolsko et al., 2006). During Phase 2, Elders in the community expressed that they also would be more comfortable in a setting where other Elders are present. In light of this, it is recommended to hold separate meetings for Elders, youth, and adults to provide a more comfortable setting for participants to share openly with others of their age group and include more rrepresentation from each group.

2.6.1.5 Recognition and respect of community priorities.

Finally, future investigators and intervention planners should be mindful of potential misalignment between the academic and community calendars. In the F2S intervention, planning necessitated balancing the schedules of local school events, cultural celebrations, and subsistence

seasons with the university academic calendar. For example, academic research partners tend to use the summer months for planning purposes; however, summer is when work group members and community partners dedicate their time to commercial fishing and subsistence harvesting activities. To counter these limitations in participation, absent work group members were kept informed via emails, text messages, telephone calls, and in-person informal conversations outside of meetings when academic partners were able to travel to the community. Accommodations were made to delay planning for less urgent intervention components until more work group members were available to participate. To avoid potential schedule conflicts, advance knowledge of competing community priorities is recommended to help the academic partners to better coordinate meeting times and scheduling intervention activities.

2.7 Conclusion/Implication for research

A commitment by researchers to understand local values and meanings of culturally important foods can strengthen food system interventions in indigenous communities. The process used to inform the F2S intervention demonstrated how the distinctive geographical, environmental, and cultural landscapes of the YK Delta all played a role in shaping the design of a food system intervention that promoted a culturally-important food. In the end, collaboration with the work group enabled the research team to appreciate community perspectives, set the stage for a mutually beneficial partnership, and generate strong community support for the program.

By engaging local perspectives and opening a dialogue on the community's priorities for the intervention, the formative research findings and processes used for the F2S may offer entry points for future research and investigation into the ways that salmon and other traditional foods contribute to well-being. Future research on this topic could also investigate the connection between other traditional foods and well-being

The F2S intervention is one design out of many possible variations. Future interventions may consider promoting the benefits of a wider range of local traditional foods. The intervention may also benefit from expanding its activities beyond the school year to take advantage of summer salmon fishing and subsistence harvest season. Additional recommended activities for

the school curriculum include a service learning component in which teachers and students can be actively engaged in applying knowledge through project-based solutions to address nutrition transition and well-being in their community.

Overall, it is hoped that the F2S intervention provides a guide for designing food system interventions that address both local and biomedical ways of understanding health. In this way, interventions can be developed to be relevant to local people's lived realities and meaningful to community members whose involvement and collective interests are vital for ensuring the long-term well-being of their community.

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Appendix

UNIVERSITY of ALASKA

Jennifer Nu <janu@alaska.edu>

Hi! Please email thesis permission request

3 messages

Jennifer Nu <janu@alaska.edu> Mon, Jun 23, 2014 at 7:59 AM
To: Joel Hunt <jhunt33@alaska.edu>

Hi Joel!!!
I hope you're having a wonderful summer! I wanted to write and thank you again for all your great work this past year. (Can you believe it's only been a year?!)

We've really accomplished so much, and we really couldn't have done it without you!

Thank you also for the fantastic Fish-to-School conceptual model illustration and for giving me permission to use it in my thesis.

For the graduate school, I will need this permission in writing. If it's still ok with you, **please respond to this email granting permission to use your illustration in my thesis.** You are mentioned in the writing and the acknowledgements as the illustrator.

Thanks again, and we'll be in touch!

Cheers,

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Joel Hunt <jhunt33@alaska.edu> Tue, Aug 5, 2014 at 8:02 AM
To: Jennifer Nu <janu@alaska.edu>

Hello Jennifer!

Yes I do give you permission to use the conceptual model for your thesis. Sorry I didn't get it to you sooner and hope all is going well for you and your thesis! It's been one busy summer and I can't believe it's already August! Good luck and thanks for the reminder!

Joel Hunt
[Quoted text hidden]

Jennifer Nu <janu@alaska.edu> Wed, Aug 6, 2014 at 1:29 PM
To: Joel Hunt <jhunt33@alaska.edu>